

Listing of Claims:

1. (Currently Amended) A semiconductor laser apparatus having a vertical emitter (2) and having at least one pump laser (5) for optically pumping the vertical emitter (2), with the vertical emitter (2) and the pump laser (5) being monolithically integrated,

wherein,

during operation, the pump laser (5) has a radiation-emitting zone (6) at a first temperature T1 and the vertical emitter has a radiation-emitting zone (3) at a second temperature T2, and the first temperature T1 is lower than the second temperature T2.

2. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1,

wherein

the pump laser (5) and the vertical emitter (2) are epitaxially grown on a common substrate (15).

3. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1,

wherein

the pump laser (5) and the vertical emitter (2) are mounted on a common mount (1), in particular a heat sink.

4. (Currently Amended) The semiconductor laser apparatus as claimed in claim 3,

wherein

the a thermal resistance between the mount (1) and the radiation-emitting zone (6) of the pump laser is less than the thermal resistance between the mount (1) and the radiation-emitting zone (3) of the vertical emitter (2).

5. (Currently Amended) The semiconductor laser apparatus as claimed in claim 3,

wherein

the vertical emitter (2) and the pump laser (5) are arranged between the a substrate (15) and the mount (1).

6. (Currently Amended) The semiconductor laser apparatus as claimed in claim 3,
wherein

one mirror layer or two or more mirror layers (4) is or are arranged
between the radiation-emitting zone (3) of the vertical emitter (2) and the mount
(1).

7. (Currently Amended) The semiconductor laser apparatus as claimed in claim 6,
wherein

the mirror layer or the mirror layers (4) is or are formed as a Bragg mirror.

8. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1,
wherein

the pump laser (5) has an active layer (16) comprising its active zone (6),
and the vertical emitter (2) has an active layer (13) comprising its active zone (3),
with the active layer (16) of the pump laser (5) and the active layer (13) of the
vertical emitter (2) having ~~the same structure and/or the same~~ at least one of an
identical structure and composition.

9. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1,
wherein

at least one of an ~~the~~ active layer (16) of the pump laser (5) ~~and/or~~ and an
~~the~~ active layer (13) of the vertical emitter (2) ~~are/is~~ is formed as a quantum well
structure.

10. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1,
wherein

an ~~the~~ active layer (16) of the pump laser (5) and ~~the~~ an active layer (13)
of the vertical emitter (2) are formed jointly in one epitaxy step.

11. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1,
wherein

the radiation-emitting zone (6) of the pump laser (5) produces pump radiation (9), which is injected into the ~~radiation-producing~~ radiation-emitting zone (3) of the vertical emitter in a direction oblique or perpendicular to ~~the~~ a main emission direction of the vertical emitter (2).

12. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1, wherein the pump laser (5) is formed as an edge emitter.

13. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1, wherein

the vertical emitter (2) is formed as a vertically emitting laser[[,]] ~~in particular formed as a VCSEL or a disk laser.~~

14. (Currently Amended) The semiconductor laser apparatus as claimed in claim 8, wherein at least one of the active layer (16) of the pump laser (5) ~~and/or~~ and the active layer (13) of the vertical emitter (2) ~~are/is~~ is formed as a quantum well structure.

15. (Currently Amended) The semiconductor laser apparatus as claimed in claim 8, wherein

the active layer (16) of the pump laser (5) and the active layer (13) of the vertical emitter (2) are formed jointly in one epitaxy step.

16. (Currently Amended) The semiconductor laser apparatus as claimed in claim 8, wherein

the radiation-emitting zone (6) of the pump laser (5) produces pump radiation (9), which is injected into the radiation-producing zone (3) of the vertical emitter in a direction oblique or perpendicular to ~~the~~ a main emission direction of the vertical emitter (2).

17. (Currently Amended) The semiconductor laser apparatus as claimed in claim 8,
wherein the pump laser (5) is formed as an edge emitter.
18. (Currently Amended) The semiconductor laser apparatus as claimed in claim 1,
wherein
the vertical emitter (2) is formed as a vertically emitting laser[[,]] ~~in particular formed as a VCSEL or a disk laser.~~
19. (New) The semiconductor laser apparatus as claimed in claim 3,
wherein
the common mount is a heat sink.
20. (New) The semiconductor laser apparatus as claimed in claim 13,
wherein
the vertical emitting laser is a VCSEL or a disk laser.
21. (New) The semiconductor laser apparatus as claimed in claim 18,
wherein
the vertical emitting laser is a VCSEL or a disk laser.